

**NOMINATION OF  
THE EVANDALE TO LAUNCESTON WATER  
SUPPLY SYSTEM 1836/1837**

FOR AN  
HISTORIC ENGINEERING MARKER

By the Canberra and Tasmania Divisions  
The Institution of Engineers, Australia

October 2001

*Includes Ceremony Report Nov 2002*

# **NOMINATION OF THE EVANDALE TO LAUNCESTON WATER SUPPLY SYSTEM**

## **FOR AN HISTORIC ENGINEERING MARKER CONTENTS**

<b>Section</b>	<b>Page</b>
Introduction	
Location Map	2
Statement of Significance	4
Commemorative Plaque Nomination	5
Documentary Evidence	5
Engineering Heritage Significance	6
Citation	6
References	7
Attachments	8

Prepared by the Engineering Heritage Panel, Canberra, in consultation with the  
Engineering Heritage Committee, Tasmania  
The Institution of Engineers, Australia

## INTRODUCTION

The Evandale to Launceston Water Supply Scheme was designed to provide water to the Town of Launceston, in the colony of Van Diemen's Land, and was one of a number of proposals submitted to Governor George Arthur in the early 1830s. Work on this major project for the fledgling colony commenced in March 1836 under the direction of Captain Alexander Cheyne, Royal Engineer (retired), with a convict labour force. The scheme included provision for water wheels to power mills, as well as water for irrigation in the Relbia Valley south of Launceston.

The source for the supply was the South Esk River approximately 17 kilometres south east of Launceston, in an area now known as Evandale. The plan was based on a tunnel through a ridge of hills north of the source, then along an open water channel using aqueducts to cross gullies, ending at a storage reservoir on Windmill Hill, overlooking Launceston. The first tunnel was abandoned after striking rock, and work started on a new tunnel with a source slightly upstream of the first tunnel. The second tunnel was to be approximately 1500 metres long with a line to the North East.

The project was never completed because the Hobart based colonial government, refused to pay compensation to affected land owners. Instead the Government opted to levy a water rate on the citizens of Launceston whereas the populace of Hobart was to be provided with water at no cost. This led to public outrage at Launceston with the citizens rejecting the supply of water. This provided a political solution to Governor Franklin, as it could be argued that the people and not the Government

stopped the work. All work ceased in December 1837.

In the 22 month period a significant amount of work was completed. This included construction of number of work camps, the largest near *Springvale* included a brick works, open channel near Relbia, and commencement of the two tunnels.

Until recently, it was believed that the project stopped because of poor engineering design and construction. However, calculations have proven that the scheme would still be able to supply the same area of Launceston with water to present times as well as the Relbia district; an area that is still severely affected by drought. Apart from the engineers showing initiative and innovation it was also undertaken at a time when there was a dearth of knowledge on hydraulics.

The remains of the second tunnel, which would have run under Evandale, include a large vertical shaft, two metres in diameter and 24 metres deep, that is brick lined for two-thirds of its length and then is hewn into rock. This shaft, number 2 of 9 is in pristine condition and is an excellent example of early convict workmanship. The entrance to the first tunnel still exists, as does the open channel at Relbia.

## LOCATION

A map showing the line of the scheme, including Tunnels Number 1 and 2 is overleaf at Figure 1.

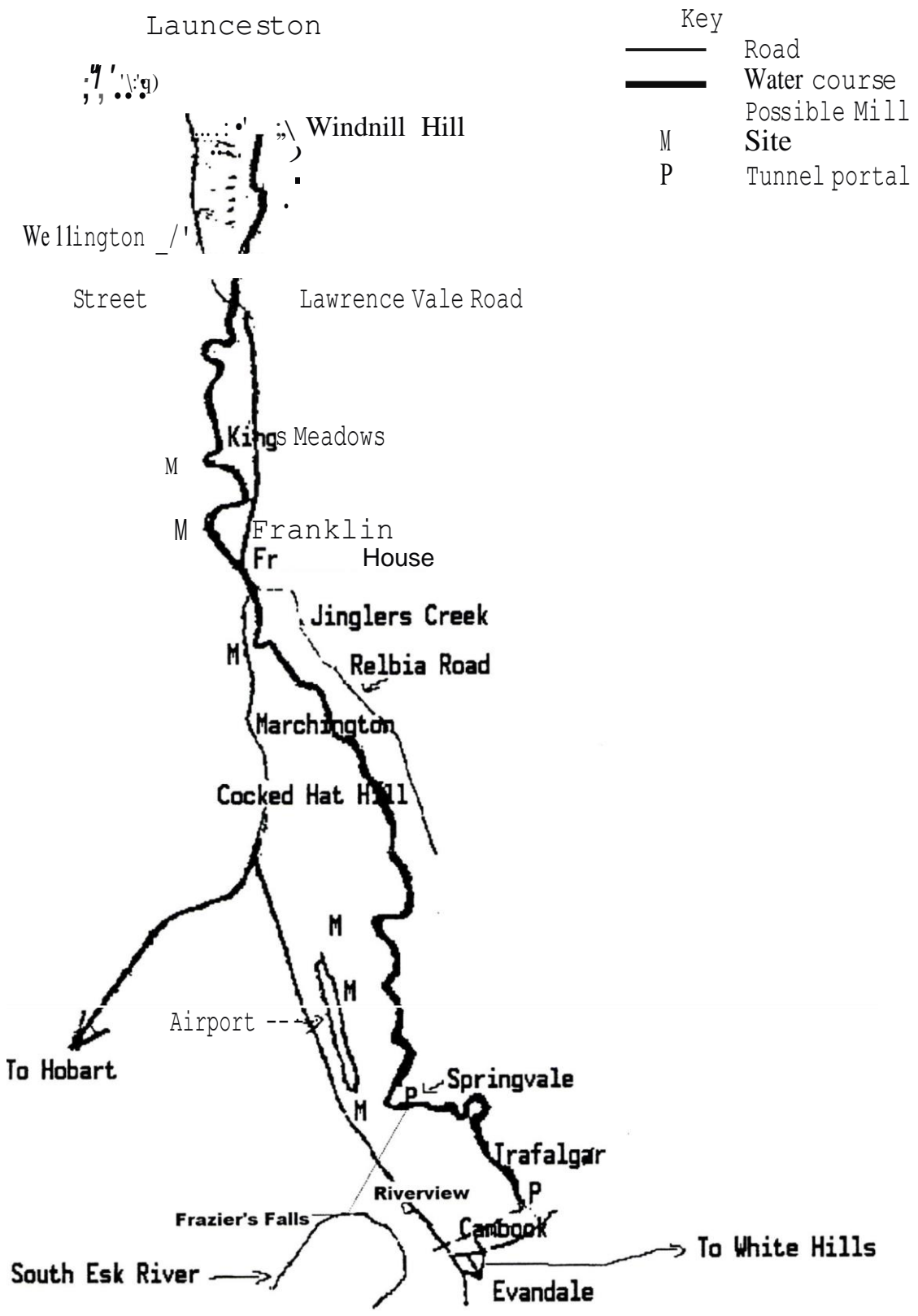


Figure 1-Location Map Showing the Line of the Scheme

## STATEMENT OF SIGNIFICANCE

The Evandale to Launceston water supply scheme, although never completed for political reasons, was well designed and would be still able to meet the water needs of Launceston to this day. This indicates a high degree of foresight and technical excellence at a time when published information on hydraulics was virtually non-existent. The engineers also displayed significant innovation and creative excellence such as the availability of water for irrigation and energy to turn mill wheels.

The project was a major works task for a fledgling colony undertaken at a time when there were very few engineers and works supervisors. The project is an early example of the importance of and need for ongoing strong political support with a major engineering task.

Shaft Number 2 of 9, on the second tunnel, has recently been renovated and is in pristine condition. The hand made bricks are in excellent condition and are placed in layers without the use of mortar. In essence, the structure is an extremely fine example of its type. The entrance to tunnel number 1 has also been renovated, to prevent further collapse. The channel at Relbia has been restored by the land owners. All of this work was undertaken by the local community under the direction of the Evandale History Society, with strong support from the Northern Midlands Council and the Tasmanian Government. Accordingly, the remains have generated strong social interest in the community.

These extremely rare remains are of regional and national significance as they vividly show the skills of colonial engineers and excellent workmanship of a convict labour force, involved with a major project.

## COMMEMORATIVE PLAQUE NOMINATION

**Name of Work:** The Evandale to Launceston Water Supply Scheme

**Location:** Entrance to Tunnel 1 – *Springvale* near Launceston Airport, Shaft Number 2 – adjacent to 24 High Street Evandale, channel – Relbia district.

**Owner:** All remains are on private land.

**Owner's Statement:** The proposal is to place the HEM at Shaft Number 2, and the owners, Ms P. Bergarnin and Mr A. Cangia, have agreed to the placement – see attachment.

**Site Access:** The land owners have agreed to access to each of the sites, and this is coordinated and controlled by the Evandale History Society.

**Care:** Future care and maintenance will be provided by the Evandale History Society in conjunction with the land owners.

**Sponsor:** The HEM is sponsored by the Engineering Heritage Panel, Canberra, and the Heritage Engineering Committee, Tasmania, The Institution of Engineers, Australia.

## **EVIDENCE**

A search of the Tasmanian Archives has located a number of letters and other correspondence relating to the scheme, but although drawings are referred to they have not been located. A selection of photographs are displayed in Attachment 1.

## **ENGINEERING HERITAGE SIGNIFICANCE**

**Year of Construction:** 1836/37.

**Period of operation:** Project was not completed.

**Physical Condition:** All remains are in excellent condition.

**Technological Value:** Very significant. Although water schemes existed in other parts of the world, the significance is that this was one of the first major schemes in Australia and was developed from first principles.

**Historical Value:** Very significant. The 165 year old remains demonstrate the planning and design skills of early Australian engineers and the work skills of convicts. The project strongly relates to the early development of society through the provision of an essential service.

**Social Significance:** Very significant. The project demonstrates the importance of and need for political support for major engineering works. The recent restoration of the remains has generated significant support and interest from the

community indicating a strong interest with historic engineering works.

**Landscape Value:** Not applicable

**Rarity:** Very Significant. The three remains are extremely rare examples of early convict works relating to water supply and tunnelling.

**Contribution:**

- (1)** National and Regional level - Project has significance in relation to politics and engineering; however, the remains are very significant because of their rarity.
- (2)** Engineering – Very significant. If completed the project would still be able to meet demand including irrigation of an area that is drought prone.

**Persons of note:** Governor George Arthur was strongly involved with the project, prior to his departure from the colony in early 1837. Captain Alexander Cheyne, RE, was the engineer. The convict architect and engineer James Blackburn

was responsible for a number of surveys working under the direction of Captain Edward Boyd, Deputy Surveyor General. Blackburn later moved to Victoria and was the designer for the Yan Yean water supply system.

**Integrity and Authenticity:** Very significant. All remains are in original condition.

**Comparable Works:** None identified.

**Proposed Plaque Location:** At Shaft Number 2, High Street, Evandale.

## CITATION

This nomination proposes to place the marker at Shaft Number 2 in High Street Evandale. Shaft Number 2 was officially opened by Mr J. Bacon, Premier of Tasmania, on 17 October 2001, after renovation works, and a plaque was placed during this ceremony. The plaque is cast in bronze, measures 300 mm by 400 mm and also includes a map of the complete system. The wording is:

*The Convict Built Evandale to Launceston Water Scheme  
1836 - 1838*

*This vertical shaft forms part of the 1600 yard (1.5 km) long tunnel passing under Evandale which was intended to supply water to Launceston from the South Esk River. After passing through the tunnel, water was to flow through a 12 mile (20 km) long open channel to Windmill Hill in Launceston. It was to also drive a number of water wheels at mill sites, and to irrigate land east of the present airport, and the Relbia Valley. This shaft, the deepest of 9, has a depth of approximately 80 feet (24 m), and a diameter of 7 feet (2.1 m). Its purpose was to enable soil and rock to be excavated from the tunnel line, and to provide ventilation. The project was constructed by convicts during the period 1836 – 1838, but was never completed. More detailed information is available at the Evandale Community Centre, 18 High Street, Evandale. Restoration work was officially opened by the Premier, The Hon. J. Bacon, MHA, on 16 October 2001.*

To avoid duplication the proposed wording for the HEM is:

### *HISTORIC ENGINEERING MARKER*

#### *THE EVANDALE TO LAUNCESTON WATER SUPPLY SCHEME*

*SIR GEORGE ARTHUR, LIEUTENANT GOVERNOR OF VAN DIEMEN'S LAND, ON THE 10TH OF MARCH 1836 APPROVED THE COMMENCEMENT OF WORKS UNDER THE ENGINEERING DIRECTION OF CAPTAIN ALEXANDER CHEYNE, INSPECTOR OF ROADS. ALTHOUGH THE WORKS WERE NEVER COMPLETED THE DESIGNERS DISPLAYED CREATIVITY AND INNOVATION SUCH THAT THE WATER NEEDS OF LAUNCESTON WOULD HAVE BEEN MET THROUGHOUT THE 20TH CENTURY. THIS SHAFT NUMBER 2 OF 9 IS AN HISTORIC RECORD OF THE SKILLS OF EARLY COLONIAL ENGINEERS AND THE CONVICT LABOUR FORCE.*

*DEDICATED BY*

*THE INSTITUTION OF ENGINEERS, AUSTRALIA  
AND THE EVANDALE HISTORY SOCIETY, 2002*

## REFERENCES

There are two known references:

A Magnificent Failure – Governor Arthur's Water Supply Scheme for Launceston From the South Esk at Evandale: 1835-7. A report for The Institution of Engineers (Tasmania) and the Evandale Bicentenary Group by Simon Harris (Hobart April 1988).

A Water Supply Scheme and Politics of the 1830s. A paper by G.F. Barker presented at the Institution of Engineers 11<sup>th</sup> National Conference on Engineering Heritage.

The report by Harris concentrates on the historical perspective and politics while Barker's paper also covers these areas as well as an analysis of the engineering design.

## ATTACHMENTS:

- (1) Photographs
- (2) Letter from landowners
- (3) Paper by G. Barker – A Water Supply Scheme and Politics of the 1830s.



## Attachment 1

### PHOTOGRAPHIC RECORD

The photographs are:

View of *Springvale* circa 1930, taken from the north of the property. This is the locality where the exit to the first tunnel is located and the water channel would have followed the contour of the sloping ground directly in front of the photographer. Photo courtesy of the McKibbin family.

View of the recently renovated opening of the exit of Tunnel 1, near *Spring vale*. Photograph courtesy of Mrs M. Maddock.

View of the water channel near Relbia, circa 1950. The area where the two people are standing is the remains of the road that was constructed alongside the channel. Photographer unknown.

View of the renovated channel, in a similar location near Relbia, circa 2000. Photo courtesy of Mrs M.Maddock.

View from the bottom of Shaft 2 on the second line of tunnel, circa 2000. Photo courtesy of Mrs M.Maddock.

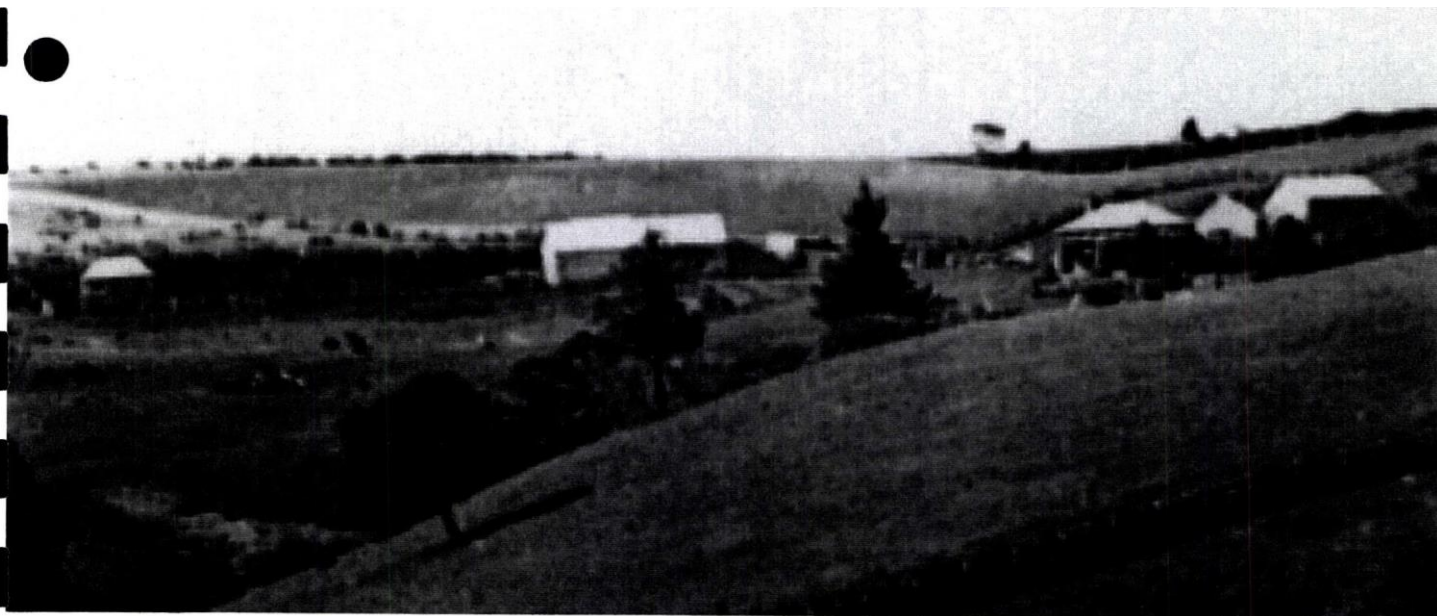
View of the top of the Shaft 2, showing recent renovations and proximity to High Street, Evandale. It is proposed to place the HEM in this location. Photo courtesy of Mrs M.Maddock.

I:  
● ●

●

1-

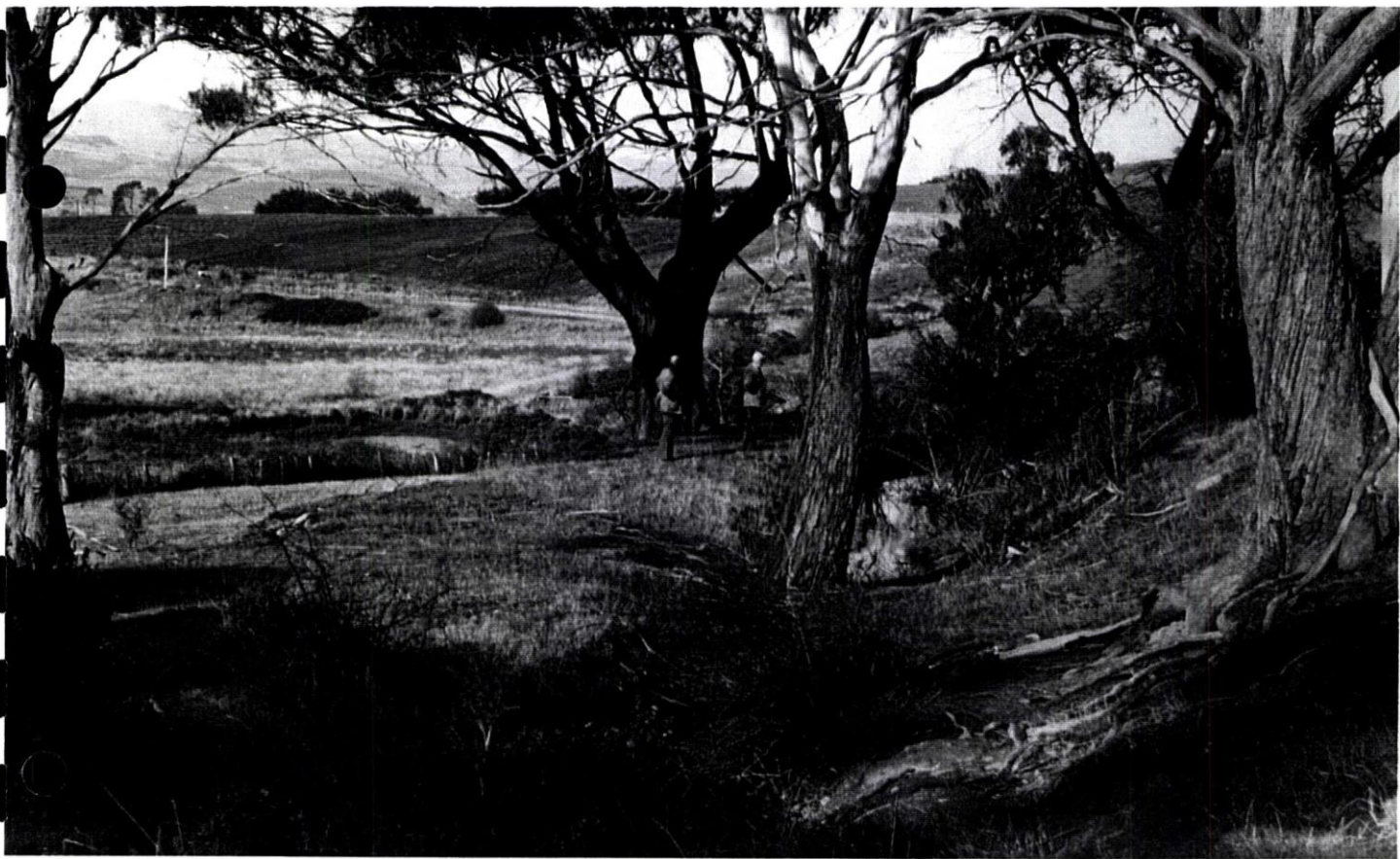
1  
● ●





Tunnel Outlet re-excavated





Tree growing in channel

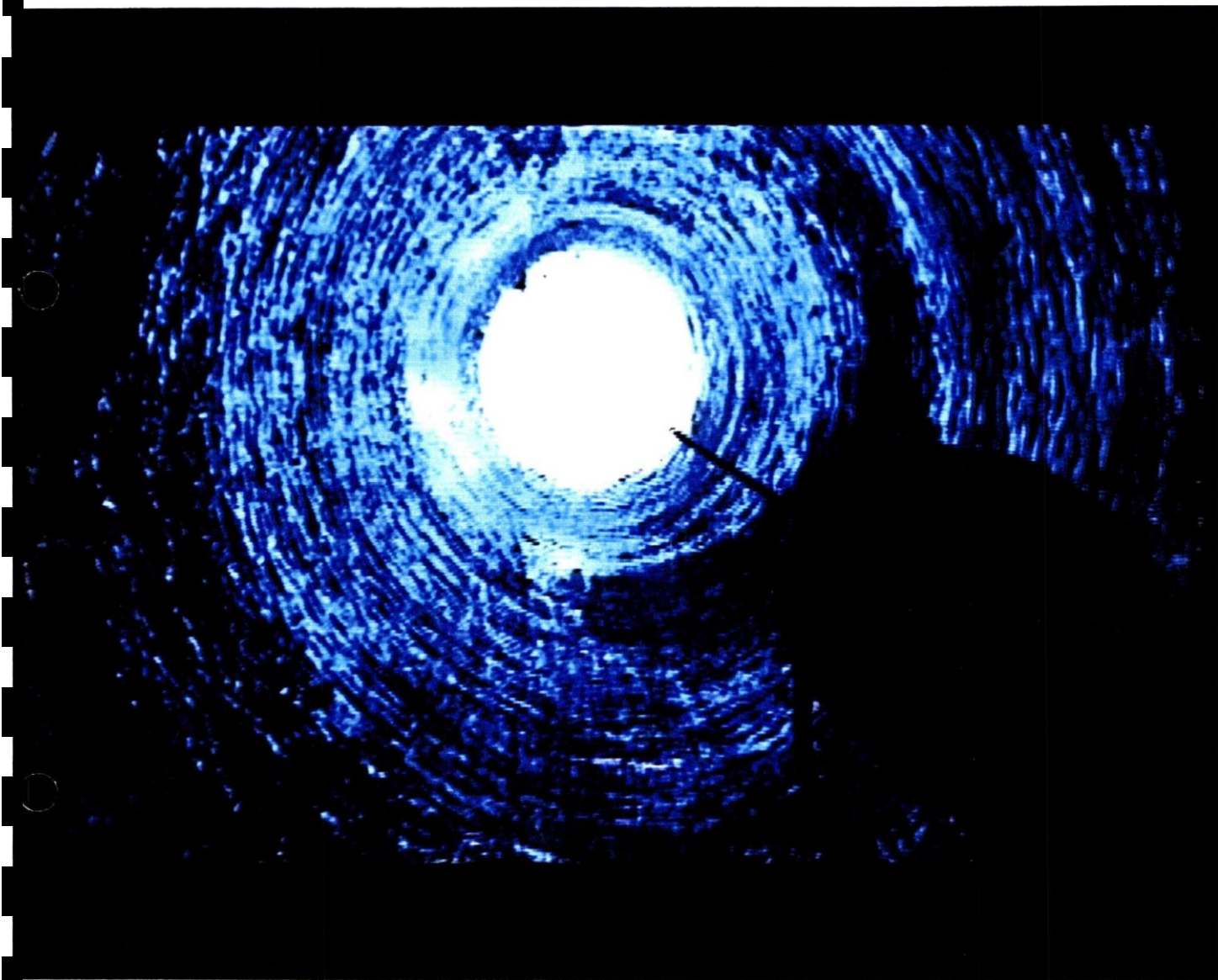


e



Restored channel near Relbia

1.



No 2 shaft from below, brick lined





No. 2. 5[-CLkt *a.fk1* e-:ic..cq,va.Jiov-v o( dv...l'V'-ped. o.\_fe.<O-A  
 Gol(o-\_y re-bu..Vlt wL /,, CoJII,VtC/ *bn:uk-s*  
 1-h, k SJ.. fVa.Y\_--d.o.,le\_ v\_.. b°'-e-k\_'] o(.  
 1

1

1 :

1

1

1

1

1

1

1

1

1e

1

1

1

1

1

1

1

ATTACHMENT 2

Paper by G.F. Barker



# A Water Supply Scheme and Politics of the 1830s

G.F. Barker, Senior Lecturer in Civil Engineering  
University College, University of New South Wales

The plan to supply the town of Launceston, in the fledgling colony of Van Diemen's Land, with drinking water from the South Esk River near Evandale was a major undertaking with significant engineering challenges and political influences. The project commenced in 1836 and involved the construction of a tunnel and 22 kilometres of open formed canal. A former military engineer supervised the work and convicts were used as the labour force. The project was abandoned in 1837, following a lack of political will to continue to provide funding. However, the scheme is remarkable because of the engineering skills and foresight used to design and construct a project in isolation from England at a time when the study of hydraulics was in its infancy. If completed the scheme would still meet Launceston's water needs as well as servicing a rural region that continues to suffer severe droughts. The issue of political involvement and frustration of engineering projects unfortunately is still present today. The pristine remains of the two tunnels and part of the canal have been uncovered in the last decade and are now being preserved because

of the historical aspects and place specific heritage conservation.

## INTRODUCTION

On the Tenth of March 1836 the Lieutenant Governor of Van Diemen's Land, Sir George Arthur, turned the first sod signifying the commencement of the long awaited and much debated Evandale to Launceston water supply scheme. Although abandoned in late 1837 and never to be completed the scheme still inspires debate. The magnitude of the project, involving tunnels, 22 kilometres of canal and access through private property, would provoke considerable discussion even if it was proposed today. It probably would not get past the feasibility planning stage for environmental reasons. For the developing colony the scheme was a major undertaking. Projects of this magnitude, regardless of where and when they occur in history, have political, engineering, social and financial ramifications that are often in conflict with each other. Over its short 13 year history this scheme would prove to be no different.

In 1988, Mr Simon Harris after researching the scheme published his findings in a report prepared for the Institution of Engineers (Tasmania) and the Evandale Bicentenary Group. The title of the report no doubts adds to the debate – A Magnificent Failure, Governor Arthur's Water Supply Scheme for Launceston from the South Esk at Evandale: 1835-7. After reading the comprehensive report I was most

impressed by Mr Harris' research of the public records and would agree that a project that commences and is never completed can be said to have failed.

However, what is intriguing about Harris' research is that the majority of the quoted documents on the scheme have a distinct political or administration flavour. There is a scarcity of engineering records, whether they are drawings, calculation sheets, or construction records. They have either been destroyed or well hidden in the archives. Some people have interpreted this situation to mean that the surveyors and engineers made mistakes of such magnitude that the scheme had to be abandoned. For example, local folklore indicates that the Evandale tunnel outlet was higher than the inlet therefore the system would never have functioned.

Did the engineers fail in the engineering aspects of the scheme or did the scheme fail for lack of political and local support? I considered this to be a topic worthy of further research. The aim has been to record what physically remains of the scheme so that an engineering analysis could be completed, as well as providing information for future generations.

Methods used to obtain information include the surveying of the remnants of the canal at Relbia, the two shafts and outlet of the Cambock tunnel,

11th Engrg Heritage Conf, C

c-- :Loo/

and the outlet of the Springvale tunnel. This was achieved by global positioning survey techniques. The survey data was cross-referenced with surviving reports and checked by further field trips to compile maps and drawings. A search was also undertaken at the Archives Office in Hobart resulting in the find of some key planning reports. Unfortunately, there was no trace of the engineering drawings often referred to in the letters of 1834 and 1835. Reports of similar schemes located overseas, that predate the Evandale Scheme, were also studied and this produced some interesting information.

### ENGINEERING PROFESSION OF THE 1800s

As the birth place of most early Tasmanian engineers is the United Kingdom it is relevant to consider the development of engineering in that country. By the Middle Ages civil works were such that it was necessary to split engineering into two divisions - military and civil. The Industrial Revolution provided tremendous impetus for developments in the arts and sciences and this led to acceptance by the mid 18th century of a new profession and order of men called Civil Engineers<sup>iii</sup>.

Civil engineering at that time was described as the art of directing the great sources of power in Nature for the use and convenience of man<sup>iv</sup>. An engineering student of the 21st century would probably use a more simple definition - engineering is the physical application of the principles of science. Of course the latter definition is fine provided the principles have been discovered, tested and communicated to all concerned. There were no engineering textbooks before 1820<sup>v</sup> so it is not surprising that these early Civil Engineers were described as 'a self-created set of men'<sup>vi</sup>. This can also be interpreted to mean that they learnt their profession by observation often involving trial

and error leading to both success and failure: A prominent engineer of the 18th century was John Smeaton, often described as the first British civil engineer<sup>vii</sup>. Smeaton was not only a leader in his profession but was also one of the few engineers to produce reports on the projects that he was responsible for. The reports were first published as a bound volume in 1812 and subsequently in 1837. Smeaton also recognized the limitations of engineers working in isolation and organized a meeting in London around

March 1771, in a suitable venue – a public house. Engineers seemed to have followed this tradition for a number of Australian founding meetings were held in hotels!

The British meetings continued until May 1792, but later in the same year a renewed interest was taken in the society and Mr Smeaton agreed to be a member. The Society of Civil Engineers was formed on the 15th of April 1793, alas without John Smeaton who died in October 1792. Names of those attending include James Watt, Sir Joseph Banks and Robert Whitworth. The Society became the Institution of Civil Engineers in 1828<sup>viii</sup> just eight years before the commencement of the water supply scheme far away in another hemisphere, and 91 years before the Institution of Engineers Australia was formed.

The successful engineers of the early 19th century were undoubtedly naturally talented and produced many fine works that still stand. Survey techniques were at a good standard and works could be set out both horizontally and vertically using a range of instruments. There was some theory on water flow which civil engineers still refer to as hydraulics. However, knowledge on the strength of soil was not as developed and limited equipment made it extremely difficult and costly to conduct sub-surface investigations, for say a tunnel.

This then was the system that produced the surveyors and engineers involved with the water supply scheme of the 1830s. Those civil engineers with a military engineering background may have had some advantage over their civil counterparts but this would be mainly in the field of administration and control rather than broad engineering knowledge. There were also many challenges for the early 19th century civil engineers particularly those working in the remote colonies, including:

- Society expectations to have knowledge and skills for a diverse range of projects.
- The distinct possibility of political interference, and dishonesty in public administration.
- Requirement to operate in uncharted areas with a dearth of available engineering information.
- Difficulty of discussing options with other engineers or keeping current with the latest writings because of isolation.

- A lack of experienced works supervisors to control the day to day operation of projects, often involving a less than willing labour force.

In summary, these early professionals were pioneers who were expected to get everything right every time. This was a situation that many could not satisfy.

## PROPOSALS AND KEY PLAYERS

Before addressing the details of the scheme it is relevant to consider the administration of Van Diemen's Land in the 1820s and 1830s. The Colonial Government and administrative offices were located in Hobart. Development in the south was favoured and was in many cases government funded with no similar dispersion to the north. The road connecting Hobart and Launceston was not completed so communication was difficult. When the Legislative Council was formed in 1824 it would be another 14 years before there would be a northern representative;\_ This state of affairs produced a north-side divide (some Tasmanians believe it is alive and well in the 21<sup>st</sup> century!) and it is in this environment that proposals for a water supply scheme for Launceston started to emerge around 1824.

Research has identified that there were a diverse number of proposals submitted by individuals and government officers. However, in relation to the scheme that construction commenced on there was no initial proposal; it was developed from two other proposals identified in 1834.

The schemes are:

- Source from the Nile River (tributary of the South Esk) 12 kilometres south of Evandale, then by canal to Evandale, then above the South Esk west of Evandale to *Spring vale*, then generally in a north west direction east of Breadalbane to Franklin Village, where the canal then meandered to Windmill Hill near Launceston.
- Source from the South Esk a few kilometres south of Evandale, then by canal to the west of Evandale following the river downstream of *Riverview* to join up with the line of the Nile canal but at a lower level, through to *Spring vale* and on to Windmill Hill.

The information was obtained from two letters written by Captain Edward Boyd, the Deputy

Surveyor General, to the Colonial Secretary', cross-referenced with early land maps and recent survey data and 1:25 000 topography maps'.

While Boyd was the proponent of these proposals, Governor Arthur had a direct involvement in a role we would now describe as the project director';. For example, it was Arthur who directed Boyd to investigate the South Esk, south of Launceston, after Boyd suggested the Cataract Gorge. Arthur also directed Boyd away from the Nile source again toward the South Esk. Arthur was obviously frustrated by a lack of engineers to provide guidance to him; however, the direct involvement of political figures in engineering planning is fraught with danger yet it still occurs<sup>xiii</sup>.

A convict named James Blackburn, who is noted as both an engineer and architect, assisted Boyd<sup>xiv</sup>. There is little doubt that Blackburn was the designer of the proposals submitted by Boyd<sup>xv</sup>, noting that many of his prominent works remain in both Tasmania and Victoria, including the Yan Yean water system north of Melbourne. Blackburn was an Inspector of the London sewers and while so employed committed fraud against his employers and was transported in 1833<sup>xvi</sup>. He was later pardoned.

In 1835 Henry Giffney was tasked by the Government Civil Engineer, John Lee Archer to investigate the merits of the two sources. This was probably at the request of Governor Arthur. Giffney recommended a source on the South Esk well south of Evandale, then by canal to the area of Gibson's Ford, by tunnel under Cambock, and then connect to the Nile line of canal near Springvale<sup>xvii</sup>. If tunneling proved difficult then the Nile line and source could be adopted. Giffney was employed as a surveyor and previously had worked in England as an assistant engineer on the Oxford Canal<sup>xviii</sup>. Nothing came of Giffney's proposals at the time.

Further decisions commenced soon after the arrival of Captain Alexander Cheyne in Hobart on the 8<sup>th</sup> of December 1835'. After leaving the Royal Engineers in 1817 Cheyne was appointed engineer-in-chief of the Edinburgh and Glasgow Canal" (some references state that he was a director<sup>xxi</sup>). Also known as the Union Canal, it was surveyed by Thomas Telford, and opened in 1821<sup>xxii</sup>. A point of interest is that the Edinburgh canal connected with the Forth and

Clyde Canal designed by John Smeaton in 1767"<sup>iii</sup>. Cheyne soon found the confidence of Governor Arthur and was appointed as the Inspector of Roads and Bridges on 18 January 1836. One of his first assigned tasks was to bring water to Hobart and Launceston.

## DESCRIPTION OF THE SCHEME

After visiting the region, Cheyne announced his plan on the 5th of March 1836, which was accepted by Arthur on the 10th March"<sup>iv</sup>. Things are now moving rapidly in days where previously little happened in years, but there would be a price to pay. Cheyne's recommendation related back to Boyd's South Esk proposal with a major modification - the source was to be downstream of *Riverview*. The revised plan involved construction of a tunnel with the inlet near the river and the outlet near *Springvale*. The system would then connect with the line of canal originally proposed for the Nile scheme. Given the events that occurred in early 1836, it is reasonable to assume that this plan was Cheynes. It is also interesting to note that on the day that Arthur accepted Cheyne's recommendation (10th March 1836) he also turned the first sod at the tunnel entrance to signify commencement of the works.

Tunneling by convict labour started from the *Springvale* end and not where Arthur turned the first sod. This is sensible practice as any water encountered in the tunnel can flow away from the working face. Work also started on forming the canal at various locations. Within 12 months the *Springvale* tunnel had been abandoned because of rock, and work had commenced on the line of tunnel under Cambock as proposed by Giffney. This modification was to also include the construction of a canal from the tunnel outlet 650 metres north east of *Cambock* homestead, via *Trafalgar* to *Springvale* to rejoin the Nile line of canal.

However, in 1837 the landowners south of Launceston commenced to agitate for compensation for damage resulting to their lands from works on the scheme. As these landowners would also receive water from the scheme their actions raised the ire of the citizens of Launceston. However, in defence of the landowners they only became aware of the scope of works on their land well after construction had commenced. The reason for this is that it was common in this period for engineers not to set

the works out in detail but to do it progressively. Not surprisingly this practice led to disagreements on land transfers and claims for trespass and damage to property<sup>xxv</sup>. This practice was not unique to Tasmania.

The Colonial Government then enacted legislation that based the payment of compensation by the levee of a water rate on the citizens of Launceston. The Launceston response was immediate - the free supply of water was now not going to eventuate, there was local frustration with the landowners and the southern seat of government could not be trusted. An impasse resulted which played into the hands of Governor Franklin, who replaced Arthur in 1836, as the people of Launceston now did not want a water supply. Work stopped at the Governor's direction in mid December 1837, despite Cheyne's lobbying that the scheme would be completed within 12 months. A similar situation occurred two hundred years earlier in France when construction of the Briare and Orleans canal stopped because of the failure to pay land compensation<sup>xxvi</sup>.

## ENGINEERING APPRAISAL OF THE FINAL SCHEME

Before I detail my appraisal I would like to address the conundrum of why the engineers did not source from the South Esk a few kilometres west of Launceston, before it flows into the Tamar, and avoid many kilometres of canal. While there is sufficient difference in elevation the country is steep and rocky making the going extremely difficult. Given the limited constraints of manpower and equipment it was far simpler to follow the rolling countryside south east of Launceston. This undoubtedly is canal country, noting that the terrain is very similar to the canal areas of England. The terrain would have appealed to the designers who were very familiar with the British canal system. I believe the designers adopted a method that they were comfortable with and required the minimum amount of resources, such as pipes, to be imported from England.

The study has identified a number of interesting points relating to the terrain and land ownership:

- The hilly terrain blocks the northerly passage of the South Esk near Evandale, causing the river to do a 180-degree turn. Evandale is sited on a boxed shaped hill, approximately 170 metres above sea level.



The South Esk in the vicinity of Evandale is 147 metres above sea level and this is similar to the levels at *Spring vale*, *Trafalgar* and to the east of *Cambock*. So to achieve a water passage based on a canal to Launceston, sourcing from the South Esk, you must excavate or tunnel or avoid the South Esk altogether.

- Although the Nile line was of sufficient elevation to remain east of *Cambock* it was planned to take the canal through the high ground where Evandale is now situated. Why Boyd chose to complicate the route near Evandale is open to conjecture as it involves construction of an aqueduct, additional canal length and excavation through Evandale and the saddle just east of *Leighton*. What is obvious is that all of Boyd's proposals avoided going through land belonging to prominent owners such as Barclay, Kennedy Murray and Cox where irrigation would have proved invaluable. Boyd even advised Arthur to reject objections from interested parties to the line of the Nile canal 'who will gladly see the water conducted over their own land, as the Canal must prove highly beneficial to every property through which it may pass'xxvii. Boyd and possibly Blackburn had either found the landowners difficult to communicate with or had decided that he who controlled the route was a power to be reckoned with.
- The advantage of sourcing on the South

Esk, over the Nile, was the more consistent volume of water. However, the natural terrain obstacle at Evandale cannot be avoided. By sourcing south of Evandale, in a flood plain, Boyd and subsequently Giffney found that they could gain height so that when the canal reached Evandale on the western side the depth of a cutting or length of tunnel could be reduced. The disadvantage is that the length of canal in the plain can be destroyed during floods. These are factors that influenced the tunnel decisions and I have little doubt that Cheyne intended to connect straight into the South Esk at Evandale with the Springvale and Cambock tunnels. The levels taken at the surviving outlet structure, east of *Cambock* are within one metre of the river level, noting that there has been significant fill placed in the outlet

The most important aspect of any water supply system is that it is consistently able to deliver the required quantity of water. Although this sounds easy to achieve there are a number of important considerations, including velocity, scouring, and wave action all of which can create havoc if not addressed. The decisions facing the engineer include the suitability of the soil forming the canal, the canal profile and the gradient. Fortunately for historians, Alexander Cheyne had a passion for paperwork. In a report to Governor Arthur on his departure from the colony on 29 October 1836 he detailed some engineering design information relating to the scheme.

Cheyne's design information for the open canal is that it is 12 foot wide and 3 foot deep with an adjacent roadway. The fall or gradient of the canal is 16 inches to the mile and there were to be seven rapid fall sites to power mills or possibly water wheelsxxxix. Cheyne did not state the slope of the canal walls. After examination of the remains at Relbia I believe the slope was probably 45 degrees producing a trapezoidal cross section. The canal floor was also examined. After removing silt and digging around 300 to 400 millimetres to the likely original floor level a layer of clay was found. This is the puddle used to seal the canal floor against leakage and also indicates that the work at each point was fully completed as construction proceeded.

The fall of 16 inches to the mile may appear to be a strange number as its corresponding ratio is 1 in 3960. However, as the surveyor's chain of 22 yards was used to measure distance the fall works out to be 2/10ths of an inch (5 mm) per chain. In reality this is fairly easy to set out in the field.

However, the key question is how did engineers choose their gradient values two hundred years ago as this is one of the key considerations when calculating the flow of water? It is known that there was considerable debate and controversy among civil engineers about desirable slopes for drainage canals around 1800", and that knowledge on open channel flow was only rudimentary.

I believe that the engineers were following standard practice as both Cheyne and Blackburn had prior experience with hydraulic structures. For example, the Doab canal in India,

constructed around the same period had a gradient that varied between 17.6 and 24 inches to the mile";. If we go back to around 25 BC a

- To avoid scouring and silting of the canal an engineering rule of thumb still in use is to

Roman engineer named Vitruvius recorded a value of '14 of an inch per hundred feet. This works out to be 13.2 inches per mile"ii.

keep the velocity around foot per second

In 1889 the Irish Engineer, Robert Manning, presented a formula for canal flow where the velocity of the water is dependant on the canal profile (known as the hydraulic radius), the gradient and surface roughness of the material that forms the canalxxxiii. When the velocity is calculated the quantity of water flowing past any point in the canal can be determined. The equations are still in use today and I have applied them to the information provided by Cheyne, to determine how well the system would have functioned. I have adopted water depths commencing at 150 mm and rising in 150 mm increments to 750 mm (gives a freeboard of 150 mm to the top of the canal banks). The results are shown in Table 1 and raise a number of

interesting points:

- Blackburn estimated that the 2000 inhabitants of Launceston would require 10 gallons a day giving a total of 20 000 gallons daily. In a perfect system without losses a canal depth of 150 mm would supply this with ease. Boyd allowed for a population of 6000 people at 8 gallons a day giving a requirement 48 000 gallons daily. The 150 mm depth also satisfies this.
- Boyd calculated the free capacity of the Nile during drought to be 20 640 gallons per hourxxxiv or 0.49 million gallons per day. This is well short of the canal capacity indicating the system was designed for a source from the South Esk.
- The average daily consumption in Launceston for December 1999, for the town area that would have been served by the scheme, was 24 megalitres"v. This equates to 5.3 million gallons per day and is well within the capacity of Cheyne's canal at a depth slightly less than 450 mm. Irrigation needs could easily be met as only 40% of the canal capacity would be utilised.
- The quantities of water for the given depths indicate that the engineers had allowed for population increase, as well as water losses at the mill sites, to irrigation, evaporation, absorption into the soil forming the canal,

and other system failures.

(0.3 m/s)"vi. An upper limit is around 0.5 m/sxxvii. For all the possible water depths in the canal the velocity limits are never exceeded.

Regardless of what equation or method Blackburn or Cheyne used they had designed a canal that could easily provide the required quantity of water and at the same time not destroy itself through scouring or silting. The system would still suffice today except for the need to provide a filtration/chlorination unit to improve the water quality.

However, it must also be appreciated that there must be some form of inlet control at the start of the system, and a storage area at the end of the system such a reservoir to balance the overall flow. To date I have not been able to determine what devices Cheyne planned to use nor how the falls at the mill site were to be controlled.

However, Boyd planned to place three series of reservoirs along Wind mill **Hill** to feed the different areas of the town. It is reasonable to assume based on the standard of setting out of the scheme, proven by recent survey, and the canal calculations that these other areas would have also been addressed. Unfortunately they are yet to be found in the archives.

My overall opinion is that despite some difficulties the design of the scheme was competent, and if completed would have easily satisfied the demands of Launceston and the surrounding districts to the present time. Even if the system was no longer used to supply potable water it would still provide water for irrigation east of Breadalbane. Similarly the construction of the canal from the Nile east of the Nile Road toward Evandale would be welcomed by farmers in an area that is still devoid of water.

I believe the scheme failed because of poor planning relating to compensation, even though Boyd highlighted this in 1834xxxviii, and the lack of a project director who had the will for the scheme to succeed.

Once Governor Arthur departed problems commenced to arise that were never ever resolved. Many of these problems related to politics, personalities, greed and ignorance. However, the end result was that the region lost an asset that it will never be able to replace. In a nation where water is an essential

commodity the long term financial ramifications resulting from the failure to complete this early engineering scheme are not hard to imagine. My opinion is that the scheme failure cannot be attributed to the standard of engineering, which appears to have been sound.

#### SCHEME REMNANTS

The Evandale – Launceston region is fortunate to have remnants of the scheme including shafts, canal and a tunnel outlet. I believe the remains have national significance, despite the scheme never being completed, as convicts did both the design and construction. The project was undoubtedly high risk but the returns to the current day would have been immense if the political will to succeed had remained. In addition, many of the bricks, made for the Cambock tunnel, have been used in buildings still occupied around Evandale.

Through the efforts of the local community a main shaft in the heart of Evandale has been cleaned out, repaired and protected. The shaft is 24 metres deep and was one of ten sunk as part of the process to establish the tunnel. The entrance of the tunnel near Springvale has also been repaired so that it may be preserved for future generations.

#### CONCLUSION

The Evandale to Launceston water supply scheme was an ambitious project that was well engineered but failed because of political will. This is an early example of the often delicate relationship between society, politicians and engineers. Without political will a major project will face a very uncertain future and we as engineers should never forget this lesson.

**Table 1 Velocity and Discharge Values for the Canal**

Depth of Water (d)	Area of Water (A)	Wetted Perimeter (P)	Velocity (V)		Discharge (Q)	
m	m <sup>2</sup>	M	ms	ft/s	m <sup>3</sup> /s	Million Gall/day
0.15	0.299	2.260	0.16	0.52	0.05	0.95
0.30	0.642	2.688	0.24	0.79	0.15	2.85
0.45	1.030	3.110	0.30	0.98	0.31	5.90
0.60	1.464	3.540	0.35	1.15	0.51	9.70
0.75	1.943	3.960	0.40	1.31	0.78	14.80

Notes:

Manning's equation:  $V = R V J S^{1/2}/n$  and  $Q = V A$

V - velocity of the water

d - depth of water

R - hydraulic radius = A/P

A - area of water

P - wetted perimeter, assumed wall slope 45°

S - gradient = 1/3960

n - coefficient of surface roughness, taken to be 0.025 for all depths

Q - discharge rate of water

#### BIBLIOGRAPHY

- Chrimes M, The Civil Engineering of Canals and railways before 1850, Ashgate, 1997  
Hall and Smith, History of Technology, Mansell, London, 1978  
Harris S, A Magnificent Failure, Report for IEAust, Hobart, 1988  
McNicoll, R.R, The Royal Australian Engineers 1835 to 1902, RAE Corps Committee, 1977  
Rolt L.T.C, Navigable Waterways, Longmans, London, 1969  
Webber N.B, Fluid Mechanics for Civil Engineers, Chapman and Hall, 1978



## REFERENCES

- i Harris S, A Magnificent Failure Governor Arthur's Water Supply Scheme For Launceston From the South Esk at Evandale: 1835-7, Institution of Engineers, Hobart, 1988
- ii Discussion between the author and Mr D. van Stieglitz of Andora, Evandale
- iii M. Taylor, Reports of the late John Smeaton, F.R.S, London 1837, preface to first edition page XX
- iv M. Chrimes, The Civil Engineering of Canals and Railways before 1850, page xi
- v Ibid, page xiii
- vi Ibid, page XX
- vii R.T.C. Rolt, Navigable Waterways, page 23
- Ibid, page X
- viii
- ix Harris, pages 95 and 96
- x Boyd's letters dated July 4th 1834 and October 25th 1834
- xi Note the map plotting is not exact as Boyd,s descriptions cannot be exactly pin pointed
- xii Ibid, pages 19 to 21.
- xiii ACT Coroner 's Report – Death of Katie Bender – dated November 1999, page.
- xiv Austral ian Dicti onary of Biograph y page 109.
- xv Letter by Alex Cheyne to the Colonial Secretary dated 5 March 1836
- xvi Australian Dictionary of Biography page 109
- xvii Harris, pages 28 and 29.
- xviii File – H.R. Giffney, LSD 1/80 pp 155 -164
- xix Australian Dictionary of Biography y page 219
- xx Hobart Town Courier 7 July 1858 (Obi tuary)
- xxi Harris, page 31
- xxii Rolt, page 55
- xxiii Chrimes, page 61.
- xxiv Cheyne's letter of 5 march 1836
- xxv M. Chrimes, Civil Engineering of Canals and Rail ways , page 85
- mi Ibid, page 26
- xxvii Boyd's letter of July 4th 1834
- xxviii On 22 Feb 1999 the water level of the South Esk at Evandale on the line of the Cambock tunnel (projected through to the river) was found to RL 147 metres . Assuming a depth of one metre to the invert of the tunnel, the inlet would be RL 146. The furthest natural surface point surveyed east (N 5398908.32, E 520964.59) of the remain ing earthen outlet structure is RL 147.16 and is considered to be in the area where the canal would have commenced . As the canal was never excavated at this point the canal depth of 3' must be subtracted giving RL 146.24. Given the amount of fill in this area and variability in river level the difference of 24 cm can be ignored . Cheyne was going to source the South Esk at Evandale.
- xxix In one report of 1834 Boyd stated that the water wheels would be overshot.
- ""Private correspondence Chrimes/Barker dated 7 June 1999
- xxxi Chrimes/Barker dated 7 June 1999
- xxxii Hall and Smith, History of Technology , page 112
- xxxiii ii Weber N.B, Fluid Mechanics for Civil Engineers , page 154
- xxxiv Correct figure is 17 200 gallons per hour (see Boyd's letter of July 4th 1834)
- xxxv Ad vice recei ved by the author from Launceston City Council (Mr V. Cooper) based on a water account from Esk Water for Dec 99.
- xxxvi Discussion Barker/Mr R. Nelson (Hydraulic Engineer), Feb 00
- xxxvii Weber, page 166
- xxxviii Boyd's letter of July 4th 1834
- xxxix Weber, page 154



ATTACHMENT 3

Agreement from Landowners, 24 High St Evandale

Date sent: **Tue, 23 Oct 2001 19:08:08 +1100**  
To: **BAR KER @ ce-nw gw.ce.adfa.edu.au**  
From: **Pasqualina Bergamin <pbergamin@ iprimus.com.au>**  
Subject: **Engineering Marker**

Dear Gary,  
Historic Engineering Marker - Evandale to Launceston Water Supply

System

We are in agreement with the proposal to have the Engineering Marker sited on our property, Ventnor, 24 High Street, Evandale, positioned at the Air Shaft together with the Evandale History Society information plaque.

Further, we understand the Marker will be positioned on site and maintained by the Evandale History Society.

Kind regards,

Pasqualina Bergamin and Andrew Cangia  
Pasqualina Bergamin  
24 High Street  
Evandale  
Tasmania 7212  
Australia

Tel/Fax: ++ 61 3 6391 8333  
email: pbergamin @ ipri mus.com.au

1  
EVANDALE TO LAUNCESTON WATER SUPPLY SCHEME  
1836/1937

CEREMONY REPORT

FOR THE AWARD OF AN  
HISTORIC ENGINEERING MARKER

in September 2002

Prepared by Tasmania Division  
The Institution of Engineers, Australia

November 2002

## CONTENTS

1. Ceremony report
2. Ceremony programme
3. Invitation to visitors
4. Bus tour programme
5. Official ceremony souvenir
6. Speech by Gary Barker
7. Speech by David van Stieglitz
8. Plaque wording
9. Ceremony photos
10. Media publicity
  - Examiner newspaper
  - Engineering Tasmania
  - An extensive segment appeared on ABC TV on  
7 September 2002

## EVANDALE-LAUNCESTON WATER SUPPLY SCHEME, 1836

### Historic Engineering Marker CEREMONY REPORT

On Saturday 7th September 2002 Engineering Heritage Tasmania arranged a ceremony to present an Historic Engineering Marker for the 1836-38 scheme to provide an adequate supply of water to the town of Launceston.

The ceremony was held in St Andrews Uniting Church and hall in Evandale where all facilities were available and immune from inclement weather. As it turned out, the

day was fine but rather cool.

Prior to the ceremony, a coach tour of several sites where sections of the works are visible was conducted for 45 of the invited guests. The tour visited the exit portal and a section of the first tunnel, a length of the canal conveying the water to Launceston and finally the No. 2 (of 9) vertical access and air shaft to the second tunnel.

At the ceremony in the church, an audience of 80 people heard Mr Gary Barker MIEAust outline the design and construction of the scheme which was carried out by Capt Alexander Cheyne RE assisted by James Blackburn, the renowned convict engineer (and designer of Melbourne's first water supply).

Mr David von Stieglitz described the restoration work carried out by the Evandale History Society. National President of the Institution of Engineers, Dr Peter Greenwood, spoke about the Institution's role in publicising historic engineering works and presented the plaque.

The Governor of Tasmania, Sir Guy Green, unveiled the plaque after a short address, and Mrs Kim Polley, Mayor of Northern Midlands Council, accepted the plaque on behalf of the Council, the several landowners containing the remaining works, and the people of Evandale.

Mr Keith Drewitt FIEAust chaired the ceremony, introducing each speaker and concluding with appropriate thanks to the people involved in the restoration work, the landowners, the speakers and the ladies mentioned below.

After the ceremony the ladies of the History Society provided an excellent afternoon tea.

That evening the ABC National News included a report on the scheme and ceremony. Other reports appeared in the Examiner Newspaper and in Engineering Tasmania.

From remarks received afterwards, it can be concluded that it was a very successful event enjoyed by all those present.

The plaque will be located at the head of the No. 2 shaft located in the front garden of 24 High Street, Evandale.

K C Drewitt  
Chair, Engineering Heritage Tasmania.





## EVANDALE PLAQUING CEREMONY

7 September 2002

*Draft programme*

### BUSTOUR

- 1300-1430      Tour commences from the St Andrew's Uniting Church in High Street. Inspect:
- the tunnel portal at "Springvale",
  - sections of the canal near Relbia,
  - Shaft NO. 2 at 24 High Street, Evandale.
- Tour guided by David von Stieglitz.
- 1430-1455      Time to look at the shaft, and walk across to St Andrews Uniting Church, and be seated by 14.55.

### CEREMONY

- 1500              HE & Lady Green arrive.
- Met by Peter Greenwood, David von Stieglitz and Keith Drewitt.
  - Inside, introduce Mayor Polley, Gary Barker and Maureen Maddocks.
- 1505              Keith Drewitt welcomes visitors, and introduces Gary Barker to outline the design and construction of the scheme (10 mins)
- 1515              David von Stieglitz to outline the History Society role in research and restoration (10 mins)
- 1525              Peter Greenwood to present the plaque (5 mins)
- 1530              Governor to unveil the plaque (5 mins)
- 1535              Kim Polley to accept the plaque on behalf of the Council and the landowners (5 mins)
- 1540              Afternoon tea.

The Division President,

Peter Godfrey FIEAust CPEng  
&

the Engineering Heritage Chairman

Keith Drewitt FIEAust CPEng  
cordially invite

*Mr & Mrs Gary Barker*

to attend a Ceremony at the

St Andrews Uniting Church, Evandale

**on Saturday, 7th September 2002 at 3.00pm**

to commemorate

**Governor Arthur's 1836-38  
Evandale to Launceston Water Supply Scheme**

with the unveiling of an

**Historic Engineering Marker**

by the Governor of Tasmania  
Sir Guy Green AC, KBE.

A free coach tour to the remaining works will leave the Church at 1.00pm,  
returning at 2.30pm.

Refreshments will be served after the ceremony.

RSVP to Catherine Reading  
by Wednesday 21 August 2002  
Tel: (03) 6234 2228  
or email: [creading@ieaust.org.au](mailto:creading@ieaust.org.au)

Attendees are requested to be seated by 2.50pm

## **EVANDALE-LAUNCESTON WATER SUPPLY SCHEME 1836**

### ***COACH TOUR BEFORE THE PLAQUING CEREMONY***

7th September 2002

The water supply scheme was intended to take water from the South Esk River at Evandale and convey it, initially through a tunnel under Evandale and then by open channel 22km long to Windmill Hill in Launceston. The scheme was intended to provide irrigation for farms and power for several water mills along the way.

The tour guide will be David von Stieglitz, a member of the Evandale History Society.

#### **PROGRAM**

- 12.45 Attendees gather at the St Andrews Uniting Church in High Street, Evandale.
- 13.00 Coach leaves the church which was built from bricks made to line the water supply tunnels.
- 13.10 Inspect the exposed tunnel outlet at "Springvale".
- 13.45 Inspect a well-preserved section of open channel near Relbia.
- 14.30 Inspect the restored Shaft No. 2 on High Street, Evandale, and walk along to the Uniting Church by 2.50pm.

#### **RSVP**

If you would like to go on the coach trip, please let Catherine know when you answer the invitation.

You may need to wear stout shoes and bring an umbrella.

,1 ,  
A..1

The INSTITUTION of  
ENGINEERS, AUSTRALIA

## THE EVANDALE TO LAUNCESTON WATER SUPPLY SCHEME

In the first half of the 19th century, Launceston had a serious problem in securing an adequate supply of good quality water. Several schemes were suggested. The most ambitious of these was proposed in 1834 by Captain Edward Boyd, Deputy Surveyor General who suggested bringing water from the South Esk near the small village of Nile. This scheme was modified in 1836 to take water from the South Esk near Evandale, first by tunnel and then by race to Windmill Hill in Launceston. James Blackburn, convict engineer, re-surveyed the line and the plan was recommended to Lieutenant Governor Sir George Arthur by Director of Public Works, Captain Alexander Cheyne RE.

A tunnel was commenced at a farm called "Spring Vale", Western Junction and was driven back towards the South Esk aiming for a location near "River View". It was described as being 'high enough to stand up in if you were not too tall and wide enough for a wheel barrow to be used'. The tunnel was abandoned after progressing 150 yards (140 m). The reasons for this are unknown. This tunnel would have been approximately 1000 yards (914 m) if completed.

A second tunnel was commenced under the present village of Evandale. It was to run from near the site of the old Evandale Railway Station, and emerge on a property called "Cambock" on the eastern side of the hill. From here, water was to run into an open channel which would around the contours until it joined up with the original one at "Springvale". Along the line of this second tunnel, nine brick-lined shafts were constructed, the deepest being 76 feet (23 m). On the 28<sup>th</sup> of October 1837, Captain Cheyne reported that

*'Seventy six convicts and four overseers were driving the tunnel for the water line. Winching up Earth and Water from the shafts and making bricks'.*

If completed this tunnel would have been 1400 yards (1280 m) in length.

The total length of the scheme was 13 miles (21 km), with a gradient of 1 in 4000. Several mill sites were planned along the route. The channel was 12 feet (3.65 m) wide and 3 feet (0.9 m) deep with a 15 feet (4.5 m) wide roadway running alongside. In Launceston the channel would have followed Lawrence Vale Road, Churchill Crescent and Sussex Street. Traces can be found near Greycliff at Youngtown, and a considerable length still remains clearly visible and holding water at Relbia.

*This description was kindly provided by the Evandale History Society.*

Official Ceremony

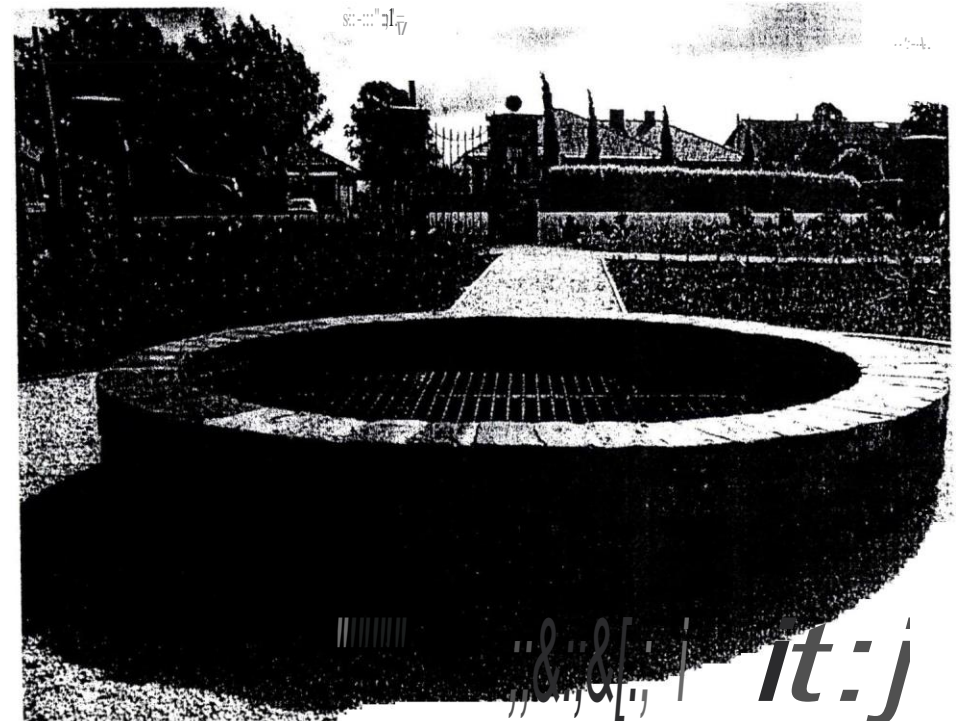
for the presentation of an

ISTORIC ENGINEERING MARKER

for the

EVANDALE TO LAUNCESTON  
WATER SUPPLY SCHEME

on 7th September 2002



## HISTORICAL NOTE

Extract from the *Hobart Town Courier*, 4 March 1836:

"The laying of the Water into the Town of Launceston, we are very happy to state, is likely now to be accomplished. On Thursday last we rode out to witness the ceremony of 'OPENING THE TUNNEL' by the Lieutenant Governor. Upwards of 250 of the Inhabitants, Military and Public Officers, were present, who joined in repeated hearty cheers towards the success of the grand undertaking. His Excellency, after BREAKING THE GROUND at the spot upon the bank of the South Esk from whence the tunnel is to commence, stated, that he hoped the Water would be in the Town of Launceston in eighteen months from that period. It appears to us very probable, that it will be longer but the time employed in perfecting the work, must depend altogether on the strength of labour the Government puts upon it, and the assiduity it exercises. The Tunnel, we understand, will be about three quarters of a mile in length - and the land marked off in the direction it is intended to take, appears to us to be soil easily worked, and consequently offering no obstructions to its speedy completion. With the exception of the Tunnel, - the Aqueduct will run through an open country the whole distance, with a fall of upwards of 400 feet."

In the event Launceston had to wait until 1857 for its first water supply.

## Australian Engineering Plaquing Programme

The erection of plaques attracts public attention to worthy historic engineering works and sites. Plaque are awarded only after the preparation of a detailed submission and approval by a national committee. National icons which have received plaques include the Sydney Harbour Bridge, the Goldfields Water Supply Scheme in Western Australia, the Snowy Mountains Scheme and our Waddamana 'A' Power Station. Many more works of state significance have been recognised Australia-wide.

Here in Tasmania plaques have been awarded to the Richmond Bridge, Kings Bridge in Launceston, Waddamana as mentioned above, the McNaught Beam Engine (on display outside the TAFE College in Hobart), the Tarraleah Power Development, Vincents Rivulet Bridge near Hobart and eight major dams (Cethana, Gordon, Catagunya, Crotty, Devils Gate, Laughing Jack, Miena and Scotts Peak).

## PROGRAMME FOR THE PLAQUING CEREMONY

at Evandale on Saturday 7th September 2002

### *Master of Ceremonies*

Mr Keith Drewitt, FIEAust  
Chairman, Engineering Heritage Tasmania

### *Design & Construction*

Mr Gary Barker, MIEAust  
Senior Lecturer in Civil Engineering, University of NSW

### *Role of the Evandale History Society*

Mr David von Stieglitz  
President, Evandale History Society

### *Presentation of the plaque*

Dr Peter Greenwood, FIEAust  
National President, the Institution of Engineers, Australia.

### *Unveiling of plaque*

His Excellency Sir Guy Green, AC, KBE  
The Governor of Tasmania

### *Response*

Mrs Kim Polley  
Mayor, Northern Midlands Council

### *Conclusion*

Mr Keith Drewitt, FIEAust

EVANDALE-LAUNCESTON WATER SUPPLY SCHEME, 1836  
Speech at Plaquing Ceremony given by  
Gary Barker, MIEAust, Senior Lecturer, University of NSW  
7 September 2002

Your Excellency and Lady Green, Mayor Kim Polly, National President Dr Peter Greenwood, distinguished guests, ladies and gentlemen. In March 1836 at a spot nearby on the South Esk River, Governor George Arthur turned the first sod on a long awaited project to supply Launceston with drinking water. Although never completed the project continues to interest the local and wider community including that of the engineering profession.

During my presentation I would like to share with you some of my findings in regard to the people involved and the actual engineering. The quest to provide Launceston with drinking water dates to the early 1820s and many proposals were put forward. Some sourced from the basins in the Cataract Gorge, others from the South Esk at Longford and further upstream, and one started on the Nile River and would have involved a 4 metre deep channel through what is now the heart of Evandale. Many of these proposals were based on the work of the deputy surveyor general Edward Boyd and the convict engineer James Blackburn. All that was needed was a

decision and an engineer!

Undoubtedly, Governor George Arthur was the driving force to start the scheme and when Alexander Cheyne, a retired Royal Engineer officer, arrived in Hobart Town in late 1835, he had his engineer. After years of procrastination, work commenced a few months later but such haste would later bring its own penalty.

The plan was to drive a tunnel through the high country to the north east of Evandale and then gravitate water by open canal to Launceston ending at Windmill Hill. This was an amalgam of other proposals but had two advantages – the canal route was

the shortest and no pipes were required.

Cheyne was assisted by Blackburn and Henry Giffney, a surveyor, and William Dawson who was the superintendent of works. We should not underestimate the challenges that these men and their convict labour force faced. They ventured underground and above ground using picks and shovels into unknown material. Have a chat with the miners who have been recently restoring Tunnel One and you will undoubtedly be told how difficult it is to work underground. And remember these are free men who can take a break when they want to, unlike the convicts. In reality the going was probably the least of the problems the engineers faced, even though it did cause the relocation of the main tunnel.

What were the others? The colony of Van Diemens Land was not rich and corruption among government officials was not unknown. The 'well to do' resided on the land and with water came political power. Plus the north-south side divide based on the Brighton line was alive and well by this time. Suffice to say these factors culminated in a debate over how the scheme was to be paid for. This led to a bill being promulgated to levy a water rate with a resulting outcry from the Launceston residents. The new Governor, John Franklin, chose other options and the work stopped in early 1838. I believe if Governor Arthur had remained that the scheme would have been completed. Engineers to this day cannot complete major projects without positive political will.

It should be said that the design was of a high standard and recent calculations show Launceston's needs and irrigation of land east of Breadalbane could still be met.

What price did the engineers pay for their involvement? Cheyne suffered immensely. He was dismissed from government service a few years later; he successfully challenged his dismissal and was reinstated but never really recovered. He was an alderman in Hobart at the time of his death. Cheyne was a bureaucrat, but was both competent and honest. However, those who record history have not been kind to him. It is pleasing to report that Dr Meg Probyn, who is present today from

Blackburn Victoria, is writing a book on Cheyne to rectify this situation.

James Blackburn was eventually pardoned, went to Victoria, designed the Yan Yean water supply scheme for Melbourne and had a suburb named after him. Giffney was less fortunate; he was later dismissed from Government service and died an alcoholic in Hobart.

Now let's move to the current time. It was on the 2<sup>nd</sup> April 2000, in this same church, that I first gave a presentation on the scheme to the local community. The challenge I gave you was to restore the remains because they are unique and of national

importance.

What you have achieved is outstanding. Governments at two levels have cooperated, committees have met and done that very rare thing of actually producing physical outcomes rather than copious quantities of meaningless words. The local engineering community has been actively involved and people from all walks of life have volunteered their time. Another important factor is that the land owners have been most willing to support the work and allow it to proceed. If only Cheyne had such cooperation all those years ago. I congratulate you all and I would be remiss if I did not thank the many people who have worked behind the scenes for this ceremony. This includes the members of the Evandale History Society, my colleagues in Engineering Heritage Tasmania and finally Professor Yeomans who has supported and funded my research.



## EVANDALE-LAUNCESTON WATER SUPPLY SCHEME, 1836

Speech at Plaquing Ceremony given by  
David von Stieglitz, President, Evandale History Society  
7 September 2002

Your Excellency, Lady Green, distinguished guests, ladies and gentlemen. I first would like to thank the Institution for this recognition of the scheme itself and the work that we have done. On a personal note, since a boy I've been fascinated with the whole thing since my father took me along many years ago to look through the then partly collapsed end of the tunnel, and told me stories of how he and his friends used to play round mysterious deep wells, shafts and things. A bit of it has turned out to be slightly enhanced compared with what's

actually there, but it was very interesting.

In starting, I'd like to first apologise for my old school friend and tennis sparring partner, Jock

Arthur. Jock couldn't make it. He is a great great great nephew of Governor Arthur.

In the time available I can't possibly thank everyone I need to thank, so I'll have to confine my remarks to the restoration work we've done on the tunnel. In other words, we opened up the collapsed entrance, shored it up with steel, and a slab of reinforced concrete. Then we cleared rubble out of it removing about 25 cubic metres using the same method that the convicts did, and I'll have more to say about that later. Finally we illuminated it only yesterday. So it was a case of it being done just in time.

After this meeting, because I can't cover all of these subjects, there will be a display at the Community Centre of all our old documents and paper-work. There is a video, which shows, not what happened in convict days, but what we've done to restore it. Anyone who would like to look at the project in greater detail than we were able to do on a rather rushed trip this afternoon, can arrange, through the History Society, to make a more complete inspection of this very interesting scheme which is considered to be the most important and biggest convict engineering project in Tasmania.

To do the work that we've done we needed money, and we were fortunate that the Northern Midlands Council, though, in the first place, Mayor Ken von Bibra said, "Well, we'll help you in every way, except with money." But, somehow, half an hour later after a cup of tea, he

conjured up a thousand dollars which kick-started it. Mayor Polley and her Council have continued with their support, and the Premier, Jim Bacon immediately committed \$1500. The Heritage Council also contributed. I would like to thank all these people. We haven't by any means come to the end of the restoration. It's a very important project and there is much more we can do but that is in the future. We hope you will continue to give us your further valuable assistance.

In spending the money we've been very economical. We haven't been involved in either verbal or written callisthenics. We haven't produced any glossy reports, we haven't had any investigations by experts, after all we've had the benefit of the advice of our honorary member, Gary Barker who is senior lecturer in civil engineering at the University of New South Wales. Before Gary went into the more academic side of engineering, he was an army engineer supervising projects in New Guinea and many other places. Like myself, on occasions, he can be found emerging from the bowels of a steam engine covered in grime, so it's a case of a very down to earth academic.

We put every cent into actually doing the job. The difficulties of emptying an old tunnel like this with a collapsed end and a rather unstable roof and a lot of rubble on the floor are formidable. Two hundred years ago, William Channing said "Difficulties are meant to rouse, not to discourage", and 50 years ago that legendary footballer Jack Dyer, "Captain Blood", said, "When the going gets tough, the tough get going". So, we took that as our creed.



We looked at Governor Arthur - a man of action. If you look at the records you find that on the 5th of March 1836, Captain Alexander Cheyne, the then Director of Public Works and Engineer in Charge recommended a scheme to Governor Arthur which was, as Gary described, to follow the contours east of the airport, and irrigate the Relbia area, very dry agricultural land. On the 10th of March Arthur signed an approval and on the 11th of March he turned the first sod. It didn't take long for him to get into action.

What do you do about clearing a tunnel? You get a miner. Fortunately we have Bill Ryan who, since being a mine manager, is now producing some magnificent sandstone from the local quarry. Bill said "There's only one way to clear that out, let's get stuck into it and do it, with barrows and shovels, just like the convicts did." And that's exactly what he did do. He got three strong young fellows to help him - Rick and Gerry Chugg and Peter Kingsley. If you see the video you'll see them working, hunched up in a tunnel 1.5m or 5ft. odd high. You can imagine working in those conditions, loading rocks and rubble into wheel-barrows on your knees, because you can't stand up, and then wheeling a heavy load 50 metres down the tunnel to dump it outside. That was a major physical effort which required, to avoid dehydration, a bit a medical treatment afterwards with appropriate liquids.

The steel work was awkward to do because it had to be partly prefabricated and manipulated into position. That was done by another of our local businesses, Dick Holtsbaum and his assistant Karl Robbers who, using my 51 year old tractor and Lincoln Welder, welded it all together .

Then Robert Campbell, a great nephew of the late Alec Campbell, the last Anzac, brought the concrete over. If he had many jobs like this one he'd go broke because it took him two hours to deliver one cubic metre of concrete which we had to poke in on top of the steel-work.

Afterwards, John Dean and John Hart stoned up the entrance with local stone which blends innicely.

As Gary said, without the land-owners co-operation, we couldn't have done anything. In this case, Guy and June McKibben were wonderfully helpful. Guy kept the back-hoe there so that we could cart away the rubble as it came out. June, apart from other things, fed us up on hot scones and cups of tea, so it was not only a challenge, but it was a pleasure.

On the previous work we did up at the shaft in High Street, we had equally good co-operation from Andrew Cangia and Pasqualina Bergamin.

There have been a lot of stories, fables, and anecdotes as to why the scheme stopped. When I was a boy, there were many of them floating about, some of them existing up to the present day. There were stories that three hundred convicts died in the tunnel and that they were buried in the cemetery across the road behind the Anglican Church. There certainly were a lot of unmarked graves there which were just bumps in the ground, and in 1960 odd I graded them all out so that the church could mow the grass and keep it a bit tidier. I suppose now I'd be jailed for desecrating historic remains. Perhaps we've learnt a bit since then.

There was a fantastic story about the engineers starting work at the river end and that the tunnel filled with water. I think that's a bit of an insult to the intelligence of those engineers because they were very competent men. When it was surveyed by Gary and the team with our modern equipment, the levels were found to be excellent, so stories like that are an insult to them. There were other rumours of faulty levels which are equally unfounded. In fact, there is an eighty metre fall between the South Esk River at Evandale and Windmill Hill where water was to run into reservoirs which would have enabled it to supply water to Launceston by gravity. It was a just matter of following the right contours, with water-wheels in some of



the valleys and fluming across low areas. It was a scheme well ahead of its time, designed to irrigate, power water wheels and supply the town with water without pumping and it's a shame that it wasn't finished after all that hard work..

As far as the accuracy goes, just as a quick illustration, Cheyne's letter said that water was to be drawn from the South Esk River at Evandale at a height of 490 feet. If you look at the map which we have on display, you'll find at that point, the 150 metre contour line runs along the river bank. If you do a conversion you find that it is 489.4 feet, so you can see that Cheyne was spot on with his levels. This shows just how much accuracy they were able to achieve with very primitive equipment.

Perhaps the most amusing claim from a farmer's point of view was that the scheme was abandoned because land-owners objected to irrigation water going to their property. Of recent years we've had to pay a lot of money to get channels dug out to do that. There was a claim for compensation which was put in four years after the scheme was abandoned by Dr J R Kenworthy, who then owned all the land on which the work had been done, both tunnels, and channelling. I quote from a letter written by Dr. Kenworthy's agent, Theodore Bartley.

"Mr. Kenworthy has hitherto delayed pressing for compensation under the hope that the proposed undertaking would be renewed, but seeing that there is no prospect thereof . . .

If you ask any farmer, particularly one who lives in the Relbia Valley, where they've got no water, whether they would object to water being supplied, I think the response you'd get

would be laughter and derision.

I think the real reason, as Gary said, was basically the lack of political drive after Governor Arthur left. He was obviously a man of action. The other thing of course was the inequitable water rate which reminds us of today's system. The other thing I think was a change in the convict system which would make it more expensive for the government to use convicts for this type of work, and I understand that more of them were transferred to road works.

In concluding, I would like to acclaim:

1. All the convicts who worked under such arduous conditions and the engineers and surveyors like Cheyne, Boyd, Blackburn, and Dawson who did their job so competently .
2. Our 2002 convicts, who worked under similar conditions to restore the project.
3. The Institution of Engineers for giving their recognition to the whole scheme and its

restoration.



The Institution Of Engineers, Australia  
and Evandale History Society, 2002

Artwork shown at half size.  
406 mm x 305 mm



## **HISTORIC ENGINEERING MARKER**

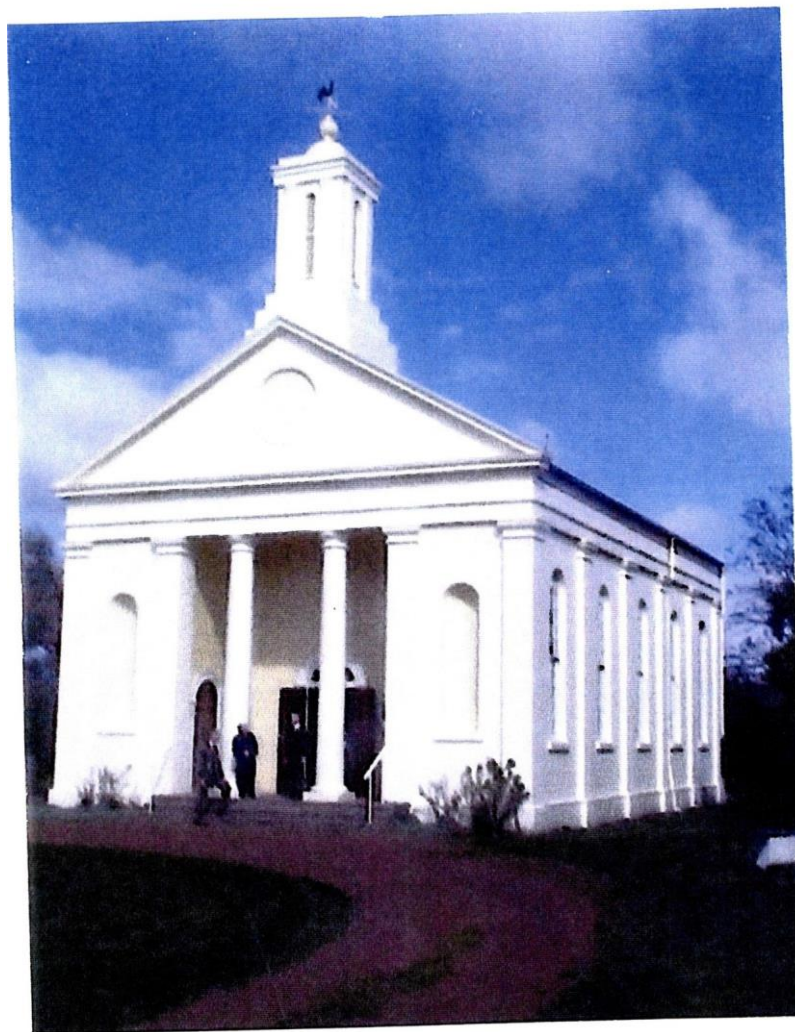
### **Evandale to Launceston Water Supply Scheme**

In March 1836 Lieutenant Governor Arthur of Van Diemen's Land turned the first sod. Engineer Alexander Cheyne and convict engineer James Blackburn directed the work. Work ceased early in 1838 after public outrage over a proposed water rate, and road construction was given precedence. If completed the scheme could have supplied the current water needs of Launceston. This shaft and other surviving works demonstrate the skills of early colonial engineers and their convict labour forces.

**The Institution of Engineers, Australia  
and Evandale History Society, 2002**

Historic Engineering Marker





St Andrews Uniting Church, Evandale



Keith Drewitt opening proceedings





Gary Barker giving his address



Gary Barker giving his address





David van Stieglitz giving his address



Peter Greenwood speaking before presenting the plaque



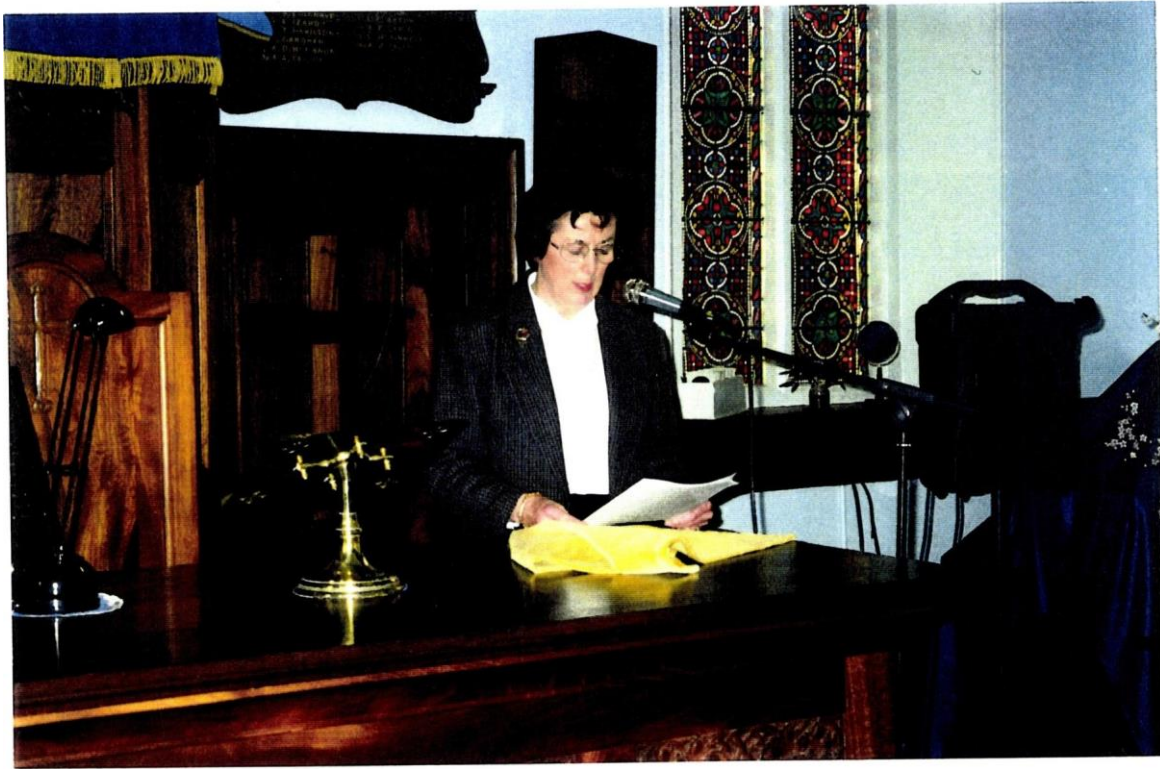


His Excellency Sir Guy Green giving his address

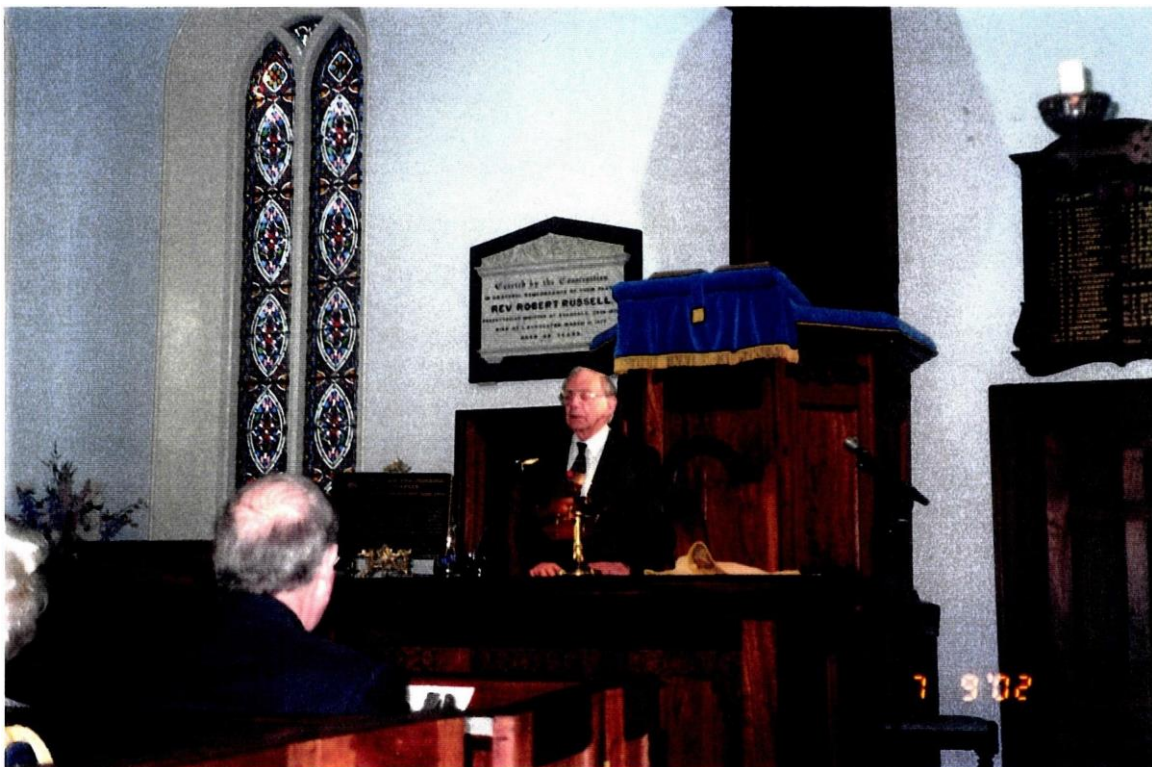


His Excellency Sir Guy Green unveiling the plaque





Mayor Kim Polley accepting the plaque

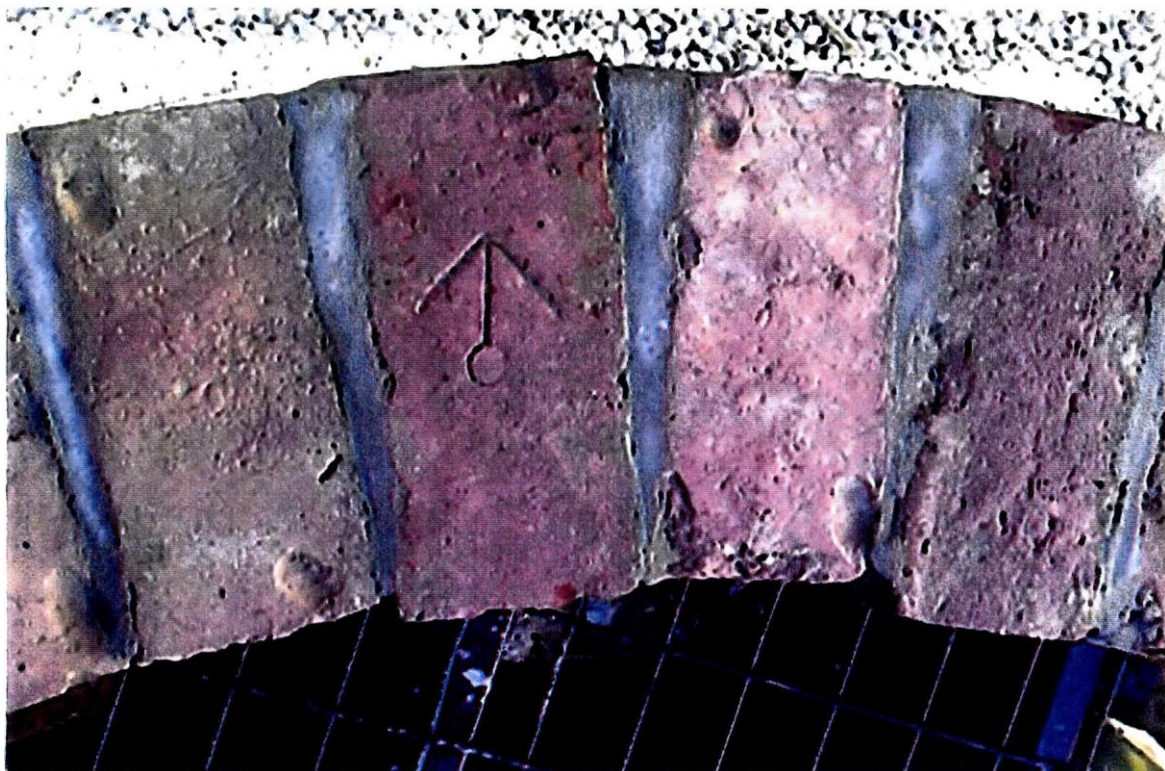


Keith Drewitt closing proceedings



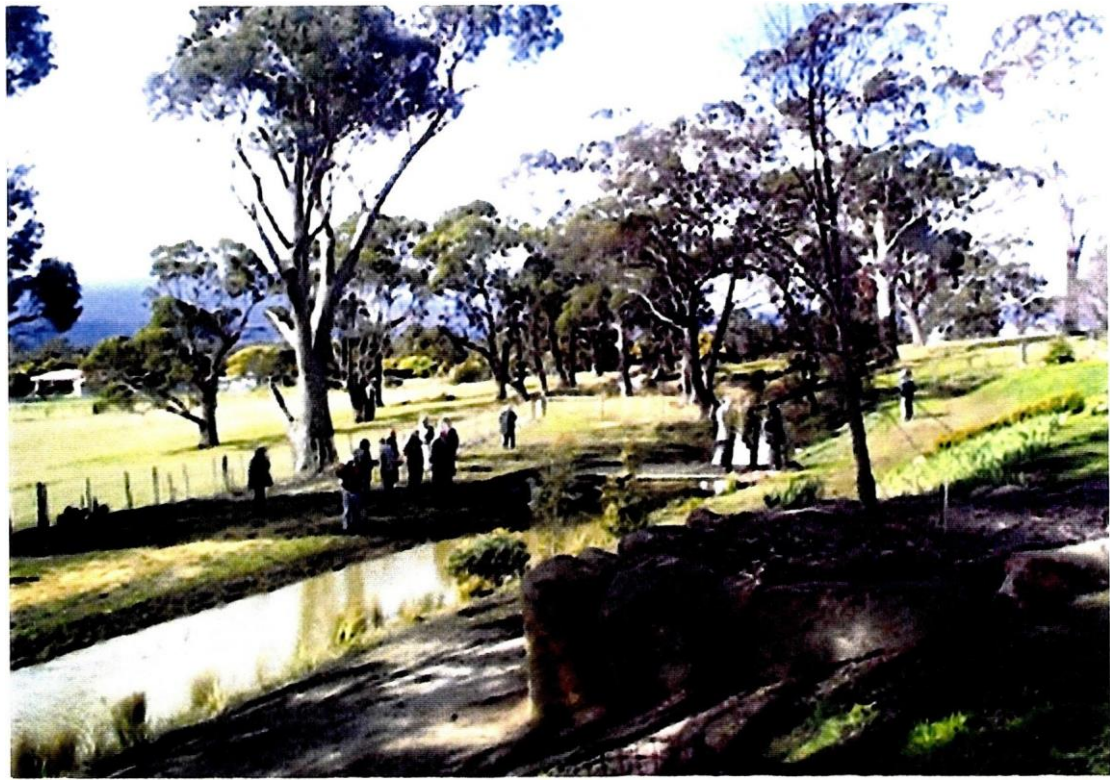


Restored collar of Shaft No2 showing existing plaque



Recycled convict bricks at top of Shaft No 2





Section of Canal near Relbia



Section of Canal near Relbia





Entrance to tunnel



Vetors nspeC tunnel







# Water scheme's doonl tf ;f •ft

A large gathering of people from all walks of life assembled at the St Andrews Uniting Church at Evandale on Saturday, September 7, to commemorate Governor Arthur's 1836-38 Evandale to Launceston Water Supply Scheme with the unveiling of a plaque.

The historic engineering plaque was unveiled by His Excellency, the Governor of Tasmania, Sir Guy Green, AC, KBE, who was accompanied by Lady Green.

Master of ceremonies at the unveiling was Mr Keith Drewitt, Engineering Heritage chairman, Tasmania.

Others taking part in the ceremony were University of NSW senior lecturer in civil engineering, Mr Gary Barker, national president of the Institute of Engineers, Australia, Dr Peter Greenwood, Evandale History Society president, Mr David von Stieglitz and Northern Midlands Mayor Kim Polley.

Mr von Stieglitz spoke of the role of the Evandale History Society in regards to the Evandale to Launceston Water Scheme and how the society had sought the advice of honorary member Gary Barker in the

## UtRvc -

### LOOKING BACK

opening up of the convict-built water tunnel and shafts at Evandale.

Gary Barker was previously an army engineer, supervising projects in New Guinea and many other places before becoming a senior lecturer in engineering.

Northern Midlands Mayor Kim Polley said the occasion had provided a time to reflect upon the remarkable achievements of the 1830s.

She said that the Hobart Town Courier of March 4, 1836, had reported the opening of the water tunnel at Evandale and the hearty cheers that went up to celebrate the grand nature of the undertaking.

She said that the unveiling ceremony also provided an opportunity for people to celebrate and consider other great achievements, both at present and in the future.

• • •

As early as 1824 residents of Launceston requested Lieut. Governor

George Arthur for a water supply, but it was to be four years later in 1828 that consideration of supplying water to the city by means of tunnels from the South Esk River at Evandale was given much thought and attention by the Government.

In May, 1833, Captain Edward Boyd, who at the time was Deputy Surveyor General, carried out extensive survey work until June, 1834, on the scheme to supply water from the South Esk to Launceston. He was assisted in his survey work by James Blackburn, a convict architect-engineer-surveyor.

On October 27, 1834, Edward Boyd stated that he had completed a map showing a section of the new line of the proposed canal to carry water from the South Esk at Evandale to Launceston.

• • •

On March 5, 1836, Captain Alexander Cheyne, Director General of Roads and Bridges and Engineer in Charge, recommended

the scheme to Governor Arthur. On March 10, Governor Arthur signed an approval and on the following day he carried out a very important function when he turned the first sod for the Evandale to Launceston Water Scheme. Upwards of 250 of the inhabitants, military and public officers were present at the time and joined in repeated cheers after the first sod was turned on the bank of the South Esk below St Andrews Church where the tunnel was to start.

• • •

The brick-lined tunnel running into the bank of the South Esk was high enough to stand up in. It disappeared during the great 1929 floods, which filled the tunnel with debris. The tunnels were to take water to Launceston by gravitation.

Recently, through the instigation of David von Stieglitz and with financial assistance from the State Government, the Heritage Council, the Northern Midlands Council and the Evandale History Society the collapsed entrance of the tunnel at Springvale near Western Junction was opened.

During the construction of the tunnel at Springvale, about 80



NEW LIFE: Visitors inspect the convict-built water tunnel at Springvale.

convicts who worked on the project were confined to barracks.

Despite the many months of hard labour by the convicts, the water scheme never came to fruition and Captain Cheyne's hopes were never fulfilled. Levels proved to be faulty, men died in collapsing tunnels and no water ever ran from Evandale to Launceston.

All the convicts who died during the construction of the tunnels were laid to rest in the English cemetery at Evandale. No monuments have been erected to their memory, but they rest from their labours in unmarked graves.

**INTERESTED:** local residents and visitors gather in High St, Evandale, to view the brick-lined shaft built by the convicts leading to the water tunnel.

## NORTHERN MIDLANDS COMMUNITY NEWS



**Mirian Lutwyche - Advertising**  
I am available on 6336 7290 or mobile 0438 217 164 or fax 6334 7327 for all your advertising needs. I will be visiting your area regularly so call now for an appointment to suit your needs.



**Ann Scott-Young - Editorial**  
I am available on 6336 7380 or fax 6334 7328 for all your editorial needs. Stories and results can be phoned through to Launceston on 1300 881 288 from 2.30-9.30 PM, including weekends, but excluding public holidays. This is a free call. Please tell the telephonist that the article is for Northern Midlands Community News.

Head Office: 71-75 Paterson St, Launceston  
Published by The Examiner Newspaper Pty Ltd at 235 East Tamar Highway, Rocherlea

**NEXT EDITION - November 12**

(Back issue closes November 6)

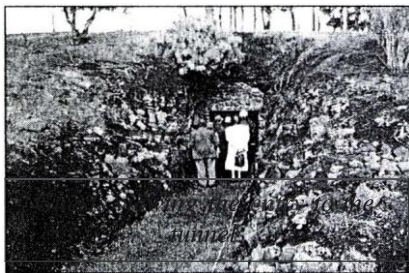


**OCCASION:** Governor Sir Guy Green unveils the historic engineering plaque at St Andrews Uniting Church, Evandale.



## EVANDALE-LAUNCESTON WATER SUPPLY SCHEME 1836 - AWARDED AN HISTORIC ENGINEERING MARKER

About 80 invited guests gathered at the Uniting Church in Evandale on 7 September 2002 to witness the unveiling of a bronze plaque awarded by the Institution of Engineers. The audience included local politicians, councillors, contractors, landowners and members of the Institution and the Evandale History Society.



Parts of the scheme, designed to supply Launceston with water from the South Esk River at Evandale, were constructed in 1836-38, but the works were never completed. A bus tour before the ceremony took 45 attendees to see some of the works still visible: a length of tunnel, a stretch of canal near Relbia and a 24 m deep shaft in High Street. Just in time for the occasion, the tunnel portal was stabilised, fallen material was shovelled out of the tunnel by hand and wheelbarrow, and lighting installed.



*Sir Guy unveiling the Plaque*

At the ceremony in the church, Keith Drewitt introduced each speaker in turn. Gary Barker, who had nominated the scheme for the award, spoke about the engineering features of the scheme. David von Stieglitz described the restoration work carried out by the Evandale History Society. Peter Greenwood, our National President, awarded the Historic Engineering Marker to the Scheme. The Governor unveiled the plaque which Mayor Kim Polley accepted on behalf of the Northern Midlands Council and the landowners on whose land the various remnants lie. All the speeches were brief and relevant.

After the ceremony participants adjourned to the Church Hall where the History Society ladies, led by Maureen Maddock, served a magnificent country-style afternoon tea. Later a video of the restoration work was shown in the Evandale Community Centre.

Altogether it was a very successful event which ran without a hitch. Even the windy weather cooperated with frequent sunshine and no rain. The plaque will be mounted at the shaft collar in High Street, Evandale.

**BRUCE COLE, FIEAust CPEng**  
Heritage Committee